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A New Compact Pollinator

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A simple and inexpensive pollinator was designed which is compact, waterproof, nonclogging, and requires only small quantities of pollen. It was used successfully in 1974 and 1975 for pollinating Scotch pine in a breeding program at the USDA Forest Service Shelterbelt Laboratory, Bottineau, N.D.

Keywords: Pollination, tree breeding, genetics.

Pollinators in current use are usually constructed with a one-way rubber bulb to force air into the pollen chamber and pollen out of it. Reines and Green (1956) attached the rubber bulb directly to the pollen chamber, while Perry (1954) attached it to a short length of glass tubing. Forbes (1974) fitted a bent piece of glass tubing inside the pollen chamber. Their pollinators are bulky, however, do not properly mix the pollen with air, and tend to plug frequently.

Our Scotch pine breeding program required a simple, compact, reliable, and inexpensive pollinator that could use small quantities of pollen and produce a desirable pollen-air mixture. We have used the pollinator described below in a controlled-pollination Scotch pine breeding scheme for two field seasons. We have found it to be completely satisfactory, with none of the shortcomings of other models.

The materials used in construction of the improved pollinator are simple and inexpensive. The pollen chamber is a polyethylene squeeze wash bottle (fig. 1a) with a screw cap (fig. 1b). The pollen passes through a polyethylene hose and nozzle (fig. 1c) and then through a disposable 18-gage hypodermic needle (fig. 1d) glued to the end of the nozzle.

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Wash bottles from Nalge Company, which include the hose and nozzle, were used. The plastic rubber glue (Duro Plastic) and hypodermic needles were purchased from local hardware and drug stores. It is important that the glue remains flexible when dry. Total cost of materials per bottle is only 60 cents, and about 3 minutes are required to assemble each pollinator.

Assembling the pollinator is simple. Insert the tubing through the cap and into the wash bottle. Tighten the cap to make a tight, waterproof seal. With a single-edge razor blade, cut off the nozzle 9 mm from its base (dotted line in fig. 1c). Spread a thin film of plastic rubber glue around the outside of the nozzle. Slip the base of the hypodermic needle over the nozzle, being careful not to clog it. The glue takes several hours to dry.

This pollinator has several advantages:

1. It is well sealed and waterproof because the 6 mm hose passes through a 5 mm hole in the screw cap (fig. 1b, c).
2. The resilient polyethylene bottle walls respond to the slightest pressure.
3. It is inexpensive, compact, light, and easy for the operator to control during pollination.
4. It handles small quantities of pollen.
5. The operator can see through the bottle and hose to observe pollen movement and control hose depth accordingly.

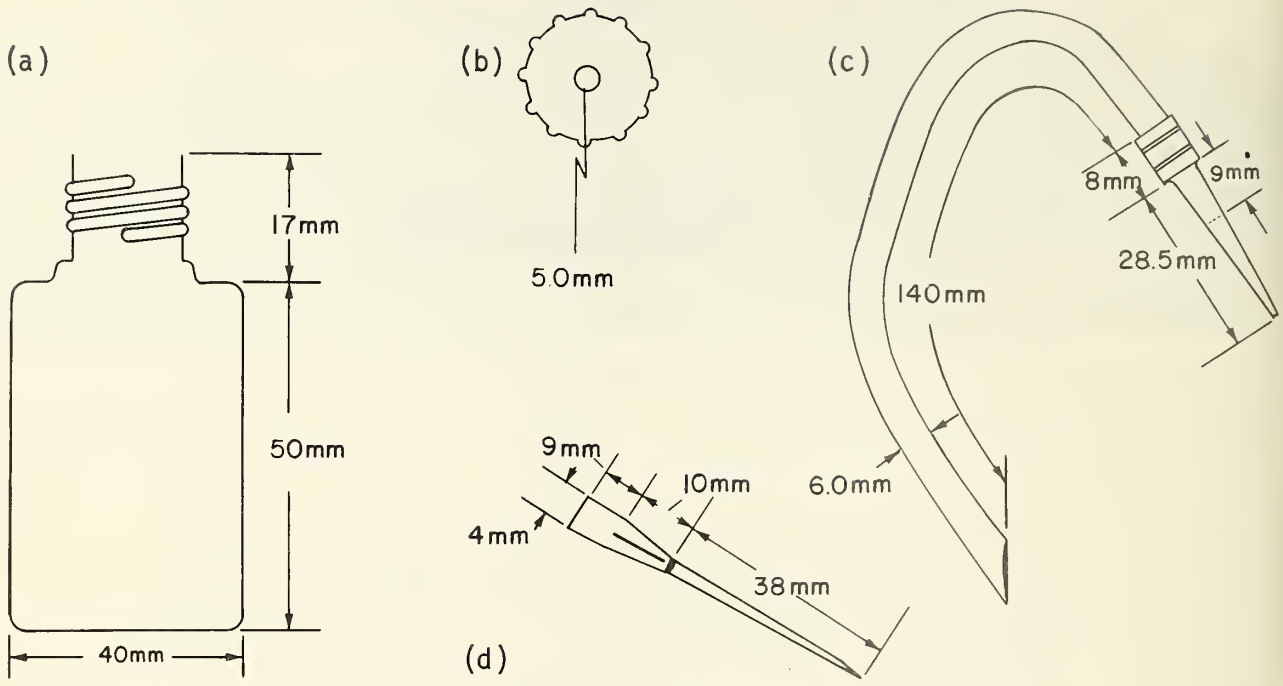

Figure 1.—Scale drawing of components of the improved pollinator: (a) polyethylene squeeze wash bottle; (b) bottle cap with top opening 1 mm smaller than hose; (c) hose and nozzle; and (d) disposable hypodermic needle.

The improved pollinator is used in the field much like other pollinating devices. Pour some pollen in the bottle; the amount is not important as long as the hose opening is immersed in the pollen. Tighten the cap on the bottle top. To inject, tilt the bottle forward at a 45-degree angle, puncture the protective bag surrounding the flower, and squeeze quickly but slightly (fig. 2). This will force an adequate quantity of pollen through the needle.

When not in use, the hypodermic needle should be forced into a urethane foam Dispo plug to prevent contamination of pollen and for safety. These plugs are quicker to use and less likely to slip off than a plastic syringe sheath.

Figure 2.—Improved pollinator being used to pollinate Scotch pine conelets.

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